

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No. 1046.1185/JDH

First Named Inventor or Application Identifier:

Nobuharu IINUMA

Express Mail Label No.

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

**ADDRESS TO: Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231**

1. ☒ Fee Transmittal Form
2. ☒ Specification, Claims & Abstract [Total Pages: 24]
3. ☒ Drawing(s) (35 USC 113) [Total Sheets: 6]
4. ☒ Oath or Declaration [Total Pages: 3]
 - a. ☒ Newly executed (original or copy)
 - b. ☐ Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional with Box 17 completed)
 - i. ☐ **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation by Reference (usable if Box 4b is checked)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Microfiche Computer Program (Appendix)
7. ☐ Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
 - a. ☐ Computer Readable Copy
 - b. ☐ Paper Copy (identical to computer copy)
 - c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. ☒ Assignment Papers (cover sheet & document(s))
9. ☐ 37 CFR 3.73(b) Statement (when there is an assignee) ☐ Power of Attorney
10. ☐ English Translation Document (if applicable)
11. ☒ Information Disclosure Statement (IDS)/PTO-1449 ☒ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
14. ☐ Small Entity Statement(s) ☐ Statement filed in prior application, status still proper and desired.
15. ☒ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☐ Other:

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information:☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: **18. CORRESPONDENCE ADDRESS**

STAAS & HALSEY
Attn: James D. Halsey, Jr.
700 Eleventh Street, N.W., Suite 500
Washington, DC 20001

Telephone: (202) 434-1500
Facsimile: (202) 434-1501

NEW APPLICATION FEE TRANSMITTAL

Attorney Docket No. 1046.1185/JDH
Application Number Unassigned
Filing Date July 29, 1998

AMOUNT ENCLOSED \$ 830.00 First Named Inventor Nobuharu IINUMA

FEE CALCULATION (fees effective 10/01/97)

| CLAIMS | (1) FOR | (2) NUMBER FILED | (3) NUMBER EXTRA | (4) RATE | (5) CALCULATIONS |
|--------|--|------------------|------------------|--------------|------------------|
| | TOTAL CLAIMS | 8 - 20 = | 0 | X \$ 22.00 = | \$ 0.00 |
| | INDEPENDENT CLAIMS | 3 - 3 = | 0 | X \$ 82.00 = | 0.00 |
| | MULTIPLE DEPENDENT CLAIMS (any number; if applicable) | | | + \$270.00 = | 0.00 |
| | BASIC FILING FEE | | | | + 790.00 |
| | Total of above Calculations = | | | | \$ 790.00 |
| | Surcharge for late filing fee, Statement or Power of Attorney (\$130.00) | | | | + 0.00 |
| | Reduction by 50% for filing by small entity (37 CFR 1.9, 1.27 & 1.28). | | | | - 0.00 |
| | TOTAL FILING FEE = | | | | \$ 790.00 |
| | Surcharge for filing non-English language application (\$130.00; 37 CFR 1.52(d)) | | | | + 0.00 |
| | Recordation of Assignment (\$40.00; 37 CFR 1.21(h)(1)) | | | | + 40.00 |
| | TOTAL FEES DUE = | | | | \$ 830.00 |

METHOD OF PAYMENT

- ☒ Check enclosed as payment.
☐ Charge "TOTAL FEES DUE" to the Deposit Account No., below.
☐ No payment is enclosed and no charges to the Deposit Account are authorized at this time.

GENERAL AUTHORIZATION

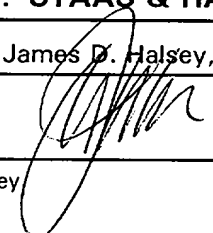
- ☒ If the above-noted "AMOUNT ENCLOSED" is not correct, the Commissioner is hereby authorized to credit any overpayment or charge any additional fees necessary to:

Deposit Account No. 19-3935

Deposit Account Name STAAS & HALSEY

- ☒ The Commissioner is also authorized to credit any overpayments or charge any additional fees required under 37 CFR 1.16 (filing fees) or 37 CFR 1.17 (processing fees) during the prosecution of this application, including any related application(s) claiming benefit hereof pursuant to 35 USC § 120 (e.g., continuations/divisionals/CIPs under 37 CFR 1.53(b) and/or continuations/divisionals/CPAs under 37 CFR 1.53(b)) to maintain pendency hereof or of any such related application.

SUBMITTED BY: STAAS & HALSEY

| | | | |
|------------|---|----------|---------------|
| Typed Name | James D. Halsey, Jr. | Reg. No. | 22,729 |
| Signature |  | Date | July 29, 1998 |

DISPLAY APPARATUS INCLUDING SCREEN SAVER FUNCTION

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention generally relates to a display apparatus for displaying characters and figures (hereinafter referred to as "image") in a computer system. More specifically, the present invention is directed to a display apparatus equipped with a screen saver function in the computer system.

2. Description of the Prior Art

Fig. 6 schematically represents a display system employed in a so-called "DOS/V" type personal computer system. This display system displays character data (text data), and image data (graphic data). It should be noted in this specification that a term "image" apparently contains images, figures, characters, graphics and the like. For example, image data may correspond to character data itself.

In this drawing, reference numeral 100 indicates a CRT display apparatus. This CRT display apparatus 100 is connected to a computer main frame, and may display thereon the text data and the graphic data. In this computer main frame, there are provided a central processing unit (CPU) 101, a graphic controller 102, a video sequencer 103, a video RAM (VRAM) 104, an attribute controller 105, a video DAC 106, and

a CRT controller 107.

The VRAM 104 is such a memory for temporarily storing data used to display dots on a display screen. Image data processed by the CPU 101 is temporarily stored into this VRAM 104. The VRAM 104 is so arranged that for instance, a plurality of video planes having capacities of 64 KB (kilobytes), or 128 KB are combined with each other.

The graphic controller 102 sequentially writes the image data processed by the CPU 101 into the VRAM 104 in accordance with the image sequence defined by the sequencer 103. Since all of the video planes of the VRAM 104 are rewritten by the image data within one time, this graphic controller 102 executes a logic calculation between the data supplied from the CPU 101 and the display screen, and thus can draw images at a high speed. In the text mode, the graphic controller 102 converts the data outputted from the VRAM 104 into parallel digital data, whereas in the graphic mode, the graphic controller 102 converts the data derived from the VRAM 104 into serial digital data, and then outputs either the parallel or the serial digital data to the video DAC 106.

The attribute controller 105 contains a palette register used to produce a 6-bit color code from 4-bit display data outputted from the VRAM 104 and to output this 6-bit color code.

The video DAC 106 converts the image data (digital

data) supplied via the attribute controller 105 into an analog signal to be displayed on the display 100.

The CRT controller 107 generates a vertical scanning signal and a horizontal scanning signal used in the display 100, and further generates a read address used to read the image data from the VRAM 104. Then, in accordance with the image display sequence defined by the sequencer 103, the image data outputted from the VRAM 104 is displayed on the display 100 under control of the CRT controller 107.

The foregoing description is made of a basic arrangement VGA (Video Graphics Array) used to display a screen image. Now, a sequential operation of displaying a Japanese language on such a DOS/V type personal computer will be described as a concrete example. In this case, text data is displayed on the CRT display 100.

First, when this DOS/V type personal computer is initiated, a predetermined storage area is secured in an extended memory, and a Japanese character font is stored into this extended memory area.

On the other hand, a virtual VRAM (namely, virtual text VRAM) area is secured in a conventional memory. This conventional memory implies the most major memory area having the capacity of 640 KB within the main memory device. When a Japanese character is entered from a keyboard, a code of this inputted character is written into this virtual VRAM.

Subsequently, a Japanese character font corresponding to the character code written into this virtual VRAM is received, and then the received Japanese character font is written into the graphic VRAM (namely, above-described video memory) to be represented on the display 100.

Such a font representation is carried out by a wordprocessor operated, or accessed on this DOS/V type personal computer. There are many possibilities that the personal computer is not actually operated for a predetermined time period, because a computer operator takes a rest while this operator forms a document, or this computer operator interrupts this document forming work, so that entries of the Japanese characters are stopped.

In such a case, if the same content of the display screen is continuously represented for a long time duration, then a so-called "image sticking" phenomenon may occur. To avoid this difficulty, a so-termed "screen saver" program has been developed. In accordance with this screen saver program, when a computer is not actually operated for a predetermined time period, screen protecting image data is slightly moved on a display screen.

However, since even such a screen saver program constitutes a portion of a computer program, this screen saver program is loaded on a main memory of a central processing unit (CPU) employed in a computer. Then, this screen saver

program is executed by this CPU, and thus, the screen protecting image data is displayed on a display unit under control of a graphic controller and a CRT controller.

As a result, even when the conventional computer is not actually operated by operators, the central processing unit and the respective controllers must be actually operated, so that the electric power is continuously consumed.

This power consumption causes a very serious problem in a portable notebook type personal computer, namely a battery capacity thereof is limited.

On the other hand, a certain type of portable notebook personal computers is equipped with a low power consumption mode. In this low power consumption mode, a screen image representation is stopped when this type of personal computer is not actually operated within a preselected time duration.

In this stopping condition of the screen display, the above-explained "image sticking" phenomenon may be avoided even when a such a screen saver program is not introduced. However, since the screen display is stopped, no operator can confirm as to whether or not the notebook type personal computer itself is operated under initiation condition, resulting in inconvenient operation.

SUMMARY OF THE INVENTION

The present invention has been made to solve the

above-explained problem and therefore, has an object to provide a display apparatus equipped with such a function operable as a "screen saver" without giving any adverse influences to operation modes of an information processing apparatus itself.

To solve the above-explained problem, a display apparatus, according to an aspect of the present invention, is featured by comprising: a display screen for displaying thereon image data sent from a main apparatus; memory means for storing therein screen protecting image data; and display control means for displaying the screen protecting image data stored in the memory means on the display screen under such a condition that the main apparatus is not actually operated for a predetermined time period.

It should be understood that the above-described main apparatus implies such a computer main frame equipped with a central processing unit (CPU), and a graphic controller. A major feature of the present invention is such that a display control means for initiating a "screen saver" program is separately employed with the computer main frame.

As the above-explained screen protecting image data, any sorts of data displayable on the screen may be used, for instance, character data, still image data, and moving picture image data. To secure such a merit that the storage capacity of the memory means can be minimized, either the character

data or the still image data is preferably employed. In general, such screen protecting image data is displayed by executing a so-called "screen saver" program. This screen saver program is initiated by such a condition that the main apparatus is not actually operated, or accessed for a predetermined time duration. Such a fact that the main apparatus is not actually operated may be judged by that no preselected computer input is made, or a predetermined access is not made to the display apparatus.

The display control means causes the screen protecting image data to be displayed on the display screen of the display apparatus. To avoid an "image sticking" phenomenon, or an "image persistence" phenomenon, when either the character data or the still image data is displayed, the display position of this screen protecting image data is varied in a time sequential manner.

It should be noted that as the above-described display screen, a flat panel display constructed of a liquid crystal display, or a plasma display is preferably used.

In this case, the above-described memory means is a data rewritable memory into which the screen protecting data can be rewritten from the main apparatus side. In other words, arbitrary image data can be selected as the screen protecting image data.

Also, a main apparatus control means is preferably

provided with the display control means provided on the side of the display apparatus. Under such a condition that the main apparatus is not actually operated, or accessed for a preselected time duration, this main apparatus control means transmits a control signal to the main apparatus side. While such a control signal is transmitted, the main control apparatus receives this control signal and can change the normal power consumption mode into the low power consumption mode. Thus, even when the main apparatus is operated in the low power consumption mode, such a condition that the screen saver is initiated can be maintained.

In the case that the present invention is grasped based upon an overall system of a computer, the present inventive display apparatus can be grasped as the following systems:

That is, an information processing system, according to another aspect of the present invention, is featured by comprising: a main apparatus for processing image data; and a display apparatus for displaying the image data sent from the main apparatus on a display screen; wherein:

the main apparatus includes an image data storage means for storing image data to be displayed; and a main display control means for causing the image data stored in the image data storage means to be displayed on the display screen; and

the display apparatus includes a memory means for storing thereinto screen protecting image data; and a sub-display control means for causing the screen protecting image data stored in the memory means to be displayed on the display screen under such a condition that the main apparatus is not actually operated for a predetermined time period.

In this case, preferably, the main apparatus is further comprised of an operation mode control means for changing a normal power consumption mode of the main apparatus into a low power consumption mode. Also, the display apparatus further includes a main apparatus control means for transmitting a control signal to the main apparatus under such a condition that the main apparatus is not actually operated for the predetermined time period. Then, upon receipt of the control signal transmitted from the main apparatus control means, the operation mode control means changes the normal power consumption mode of the main apparatus into the low power consumption mode.

In addition, a display control apparatus having the function according to the present invention may be interposed between a computer main frame and a display apparatus.

As this display control apparatus, the below-mentioned display control apparatus may be accomplished.

That is, a display control apparatus, according to a further aspect of the present invention, is featured by

comprising: memory means for storing thereinto screen protecting data; and display control means for causing the screen protecting image data stored in the memory means to be displayed on a display screen of the display apparatus under such a condition that a main apparatus is not actually operated for a predetermined time period; whereby:

when no access is made from the main apparatus to the display apparatus for the predetermined time period, an image produced from screen protecting image data is displayed on the display screen of the display apparatus.

In this case, the above-described memory means is a data rewritable memory into which the screen protecting data can be rewritten from the main apparatus.

Also, a main apparatus control means is preferably provided with the display control means provided on the side of the display apparatus. Under such a condition that the main apparatus is not actually operated, or accessed for a preselected time duration, this main apparatus control means transmits a control signal to the main apparatus side. While such a control signal is transmitted, the main control apparatus receives this control signal and can change the normal power consumption mode into the low power consumption mode.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the present invention, reference is made of a detailed description to be read in conjunction with the accompanying drawings, in which:

Fig. 1 is a schematic block diagram for showing a display apparatus of a notebook type personal computer, according to an embodiment of the present invention;

Fig. 2 is a schematic block diagram for representing a display control apparatus of the display apparatus shown in Fig. 1;

Fig. 3 is a flow chart for describing a process flow operation of the display apparatus shown in Fig. 1;

Fig. 4 represents an operation condition table in comparison with the prior art;

Fig. 5 is a schematic block diagram for indicating an arrangement of a display apparatus according to another embodiment of the present invention; and

Fig. 6 is a schematic block diagram for showing the conventional image display process operation.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to drawings, various preferred embodiments of the present invention will be described in detail.

Fig. 1 and Fig. 2 are schematic block diagrams for representing an arrangement of a display apparatus according

to an embodiment of the present invention.

In Fig. 1, reference numeral 1 denotes a display apparatus of a so-called "notebook type personal computer." This display apparatus 1 is connected to a computer main frame 2.

The computer main frame 2 contains a central processing unit (CPU) 3, a graphic controller 4 which constitutes a main display control means, and a VRAM (video RAM) 5 for storing image (video) data processed in the central processing unit 3. The above-explained arrangement of this computer main frame 2 is similar to that of the conventional computer main frame. As a result, although not shown in the drawing, input/output devices such as a keyboard, a mouse, a CD-ROM drive, and a floppy disk drive; a main memory; and an extended memory and the like are provided as standard devices, or optional devices. It should be noted in this specification that a term "image" apparently contains images, figures, characters, graphics and the like. For example, image data may correspond to character data itself.

In the computer main frame 2, a normal power consumption mode and a low power consumption mode can be selectively set as a power consumption function. In the normal power consumption mode, a commercial power source is used to drive this computer main frame 2. In the low power consumption mode, a battery built in this notebook type

personal computer is used to drive this computer. When this low power consumption mode is selected, when the personal computer is not actually operated for a preselected time period, a supply of electric power to at least one of the central processing unit 3 and the graphic controller 4 is stopped, or interrupted so as to save the actual power consumption in this personal computer.

On the other hand, a liquid crystal flat display screen 21, a flat panel controller 22, and a RAM (memory means) 23 for storing screen protecting data are provided in the display apparatus. The flat panel controller 22 functioning as a sub-display control means sequentially supplies the image data which are sent from the above-described graphic controller 4 functioning as a main display control means to the liquid crystal display screen 21 for display controls. The screen protecting data RAM 23 is connected to the flat panel controller 22, and stores thereinto the screen protecting data.

As indicated in Fig. 2, a graphic processor 25 is employed in the display control means (flat panel controller) 22, and a "screen saver" (program) is functionally realized on this graphic processor 25. It should be noted that this screen saver is a computer program previously stored in a ROM (read-only memory) 26. Also, a screen saver driver 27 is functionally realized in the form of a computer program in

Patented 1984

this display control means (flat panel controller) 22. When no input is entered into the computer main frame 2 for a predetermined time duration, this screen saver driver 27 executes initiation/stop controls of the screen saver, and furthermore transmits a control signal to the computer main frame 2. On the other hand, the screen saver driver 27 may constitute a portion of the display control means, and also a main apparatus control means. This display control means causes the screen protecting image data stored in the memory means to be represented on the display screen under such a condition that the main apparatus is not actually operated for a preselected time period. Also, this screen saver driver 27 transmits the control signal to the main apparatus under such a condition that the main apparatus is not actually operated for a preselected time duration. This screen saver driver 27 is previously stored in the above-described ROM 27 in the form of the computer program, and is initiated to become activated on the graphic processor 25 at the same time when the power source of the display apparatus is turned ON.

The screen saver is such a computer program used to read the characters and the image data stored in the screen protecting data RAM (memory means) 23, and to change the display positions of these characters and image data on the display screen in a time sequential manner. Since the data saved in this screen protecting data RAM (memory means) 23 can

be rewritten, these saved data may be rewritten by the data entered from the input device provided on the computer main frame 2.

It should be understood that a GPIO (General-Purpose Input/Output) terminal is provided with the above-described graphic controller 4, and this GPIO terminal is connected to an I/O terminal of the flat panel controller.

A description will now be made of operations of this display apparatus according to the present invention.

NORMAL SCREEN DISPLAY OPERATION

The image data processed in the central processing unit 3 is once stored in the VRAM 5 under control of the graphic controller 4 of the computer main frame 2. Thereafter, the image data sequentially outputted from the VRAM 5 are displayed on the display screen 21 under control of the flat panel controller 22 in response to the control signal supplied from the graphic controller 4. As to this operation, the basic operation of the display apparatus according to this embodiment is similar to that of the conventional display apparatus, although the flat panel controller 22 is newly employed.

OPERATION OF DISPLAY APPARATUS WHEN COMPUTER OPERATION IS INTERRUPTED FOR PREDETERMINED TIME

Referring now to a flow chart shown in Fig. 3, a description will be made of operation of the display apparatus

when the computer operation is stopped during a predetermined time period.

A program indicated in this flow chart is a routine executed every time a clock has passed for a predetermined time period.

First, when the clock for determining the execution time of the routine is counted during a preselected time period, a judgment is made at step 10 as to whether or not a predetermined input is entered to the computer until the clock is counted for a predetermined time period. In other words, the operation judging means of the computer may be realized. When the input is entered into the computer, the clock is delayed (step 11). That is to say, this routine shown in Fig. 3 is not executed during this delayed time.

Conversely, when a predetermined input is not entered into the computer at step 10, a control signal is transferred via the GPIO of the graphic controller 4 (step 12).

Upon receipt of this control signal, the screen saver driver 27 continuously activated the graphic processor 25 of the flat panel controller 22 initiates the screen saver (step 13).

Next, a check is made as to whether or not the screen saver is initiated under normal condition (step 14). In such a case that this screen saver is not initiated under normal condition, an error message is displayed by the flat panel

controller (step 15). Thereafter, this process operation is advanced to the next step 16.

Conversely, when the screen saver is initiated under normal condition, this process operation is directly advanced to step 16. At this step 16, the screen saver driver 27 sends a stop control signal to the computer main frame 2.

Upon receipt of the stop control signal, the operation mode of the computer main frame 2 is changed into the low power consumption mode (namely, suspend mode), and therefore, at least one of the graphic controller 4 and the central processing unit 3 is stopped (step 17). As a consequence, while the screen saver is displayed on the display screen on the side of the display apparatus, namely the screen saver initiation condition, both the central processing unit 3 and the graphic controller 4 are stopped on the side of the computer main frame, namely the suspend condition. This control operation according to the embodiment of the present invention could not be realized in the prior art display apparatus.

Alternatively, it is possible to set such an operation mode that no screen saver is continuously initiated. In this case, the process operations defined at steps 13, 14 and 15 are not executed, but the screen saver driver 27 simply transmits the stop control signal to the computer main frame 2 in step 16. As a result, when the process operation defined

at the subsequent step 17 is carried out, both the central processing unit 3 and the graphic controller 4 are brought into the suspend condition, and at the same time, the screen display is brought into the OFF state. The above-described operation results are indicated in a table of Fig. 4.

Thereafter, when an input is again entered to the computer (step 18), both the central processing unit 3 and the graphic controller 4 are initiated by receiving this input as a trigger signal (step 19). At the same time, another trigger signal (control signal) issued from the GPIO of the graphic controller 4 is sent to the flat panel controller (step 20).

Upon receipt of this trigger signal, the screen saver driver accomplishes the screen saver (step 21).

On the other hand, since the central processing unit 3 is again initiated at step 19, the processed image data which has been produced before the computer input operation is interrupted is supplied from the VRAM 5 via the flat panel controller 22 to the display screen 21 under control of the graphic controller 4. As a result, the original (previously produced) image is displayed on the display screen 21 (step 22), so that the subsequent computer process operation may be restarted.

OTHER EMBODIMENTS

In the foregoing description, the overall computer system equipped with the display apparatus according to the

present invention has been described. Alternatively, another computer system may be arranged as indicated in Fig. 5. That is, both the display control means (controller) 22 containing the microcomputer, the screen-saver-built-in type ROM, and the screen-saver-driver-built-in type ROM, and further the screen protecting data RAM (memory means) 23 may be formed as a display control apparatus 31. This display control apparatus 31 is physically separated from the display apparatus 1. Then, this separately provided display control apparatus 31 is added to the display apparatus 1 equipped with the display screen 21 and the panel controller 41 having no screen saver function.

Also, in each of the above-described embodiments, when the memory means 23 for storing the screen protecting data is realized as a detachable type memory with respect to the display apparatus, the screen protecting data may be simply replaced. In particular, when a plurality of cartridge type ROMs capable of storing therein different sorts of screen protecting data are preferably employed, the screen protecting data may be more simply replaced.

It should be understood that although this embodiment is basically applicable to a CRT display apparatus in view of the theoretical aspect, but this embodiment may be suitably applied to such a liquid crystal type display device equipped with a flat panel controller functioning as a dedicated

graphic controller in view of the realistic aspect. This dedicated graphic controller is separately provided with a graphic controller employed in a computer main frame.

As previously described in detail, according to the present invention, the screen saver function which can be separately initiated irrespective of the operations of the main unit of the information processing apparatus, can be realized on the side of the display apparatus.

As a result, in the case that the low power consumption function is provided in the information processing apparatus, while the screen saver can be initiated on the display screen, the main unit of the information processing apparatus is brought into the low power consumption condition.

WHAT IS CLAIMED IS:

1. A display apparatus comprising:
a display screen for displaying thereon image data sent from a main apparatus;
memory means for storing thereinto screen protecting image data; and
display control means for displaying said screen protecting image data stored in said memory means on the display screen under such a condition that the main apparatus is not actually operated for a predetermined time period.
2. A display apparatus as claimed in claim 1 wherein:
said memory means is a data rewritable memory, and the image protecting data is written into the memory means from said main apparatus.
3. A display apparatus as claimed in claim 1 wherein:
said display control means provided on the side of said display apparatus includes a main apparatus control means for transmitting a control signal to said main apparatus under such a condition that the main apparatus is not actually operated for the predetermined time period.
4. An information processing system comprising:
a main apparatus for processing image data; and
a display apparatus for displaying the image data sent from said main apparatus on a display screen; wherein:
said main apparatus includes an image data storage

means for storing image data to be displayed; and a main display control means for causing the image data stored in said image data storage means to be displayed on the display screen; and

said display apparatus includes a memory means for storing therein screen protecting image data; and a sub-display control means for causing said screen protecting image data stored in said memory means to be displayed on said display screen under such a condition that said main apparatus is not actually operated for a predetermined time period.

5. An image processing apparatus as claimed in claim 5 wherein:

said main apparatus further includes an operation mode control means for changing a normal power consumption mode of said main apparatus into a low power consumption mode;

said display apparatus further includes a main apparatus control means for transmitting a control signal to said main apparatus under such a condition that said main apparatus is not actually operated for the predetermined time period; and

upon receipt of said control signal transmitted from said main apparatus control means, said operation mode control means changes said normal power consumption mode into said low power consumption mode.

6. A display control apparatus comprising:

memory means for storing thereinto screen protecting data; and

display control means for causing the screen protecting image data stored in said memory means to be displayed on a display screen of said display apparatus under such a condition that a main apparatus is not actually operated for a predetermined time period; whereby:

when no access is made from the main apparatus to said display apparatus for said predetermined time period, an image produced from screen protecting image data is displayed on the display screen of said display apparatus.

7. A display control apparatus as claimed in claim 6 wherein:

said memory means is a data rewritable memory, and the image protecting data is written into the memory means from said main apparatus.

8. A display control apparatus as claimed in claim 6, further comprising:

a main apparatus control means for transmitting a control signal to said main apparatus under such a condition that the main apparatus is not actually operated for the predetermined time period.

ABSTRACT OF THE DISCLOSURE

In a notebook type personal computer, the operation mode of this personal computer is switched into a low power consumption mode even while a screen saver function is actuated. A display apparatus used in such a notebook type personal computer is arranged by a display screen for displaying thereon image data sent from a main apparatus; memory means for storing therein screen protecting image data; and display control means for displaying the screen protecting image data stored in the memory means on the display screen under such a condition that the main apparatus is not actually operated for a predetermined time period.

FIG. 2

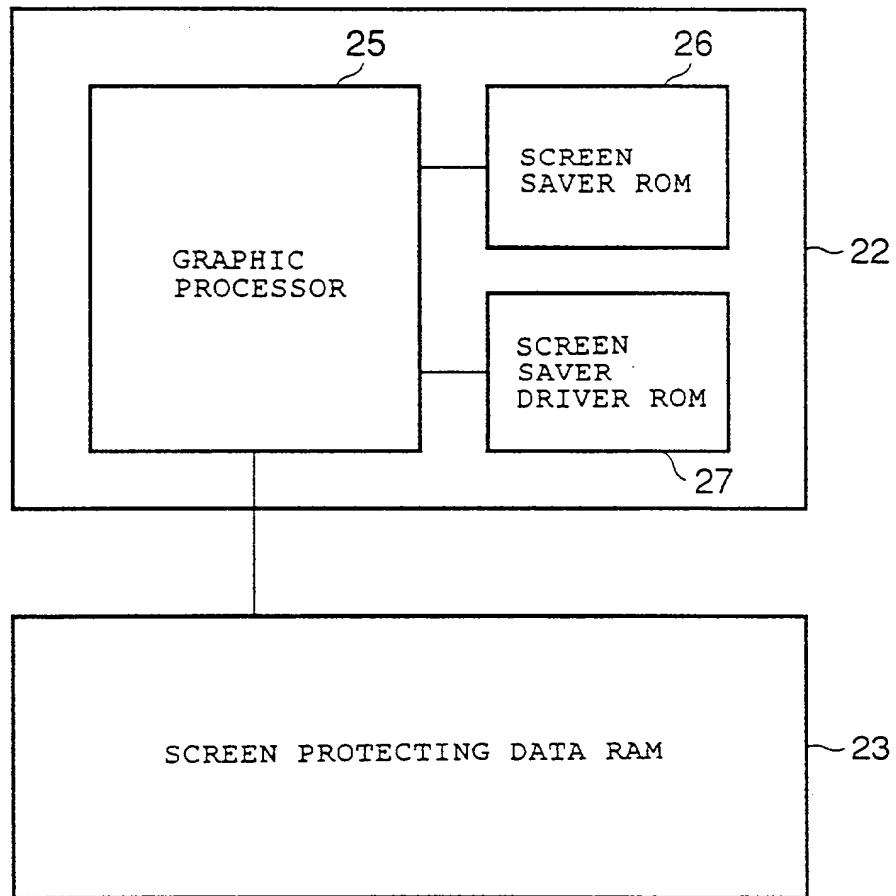


FIG. 3

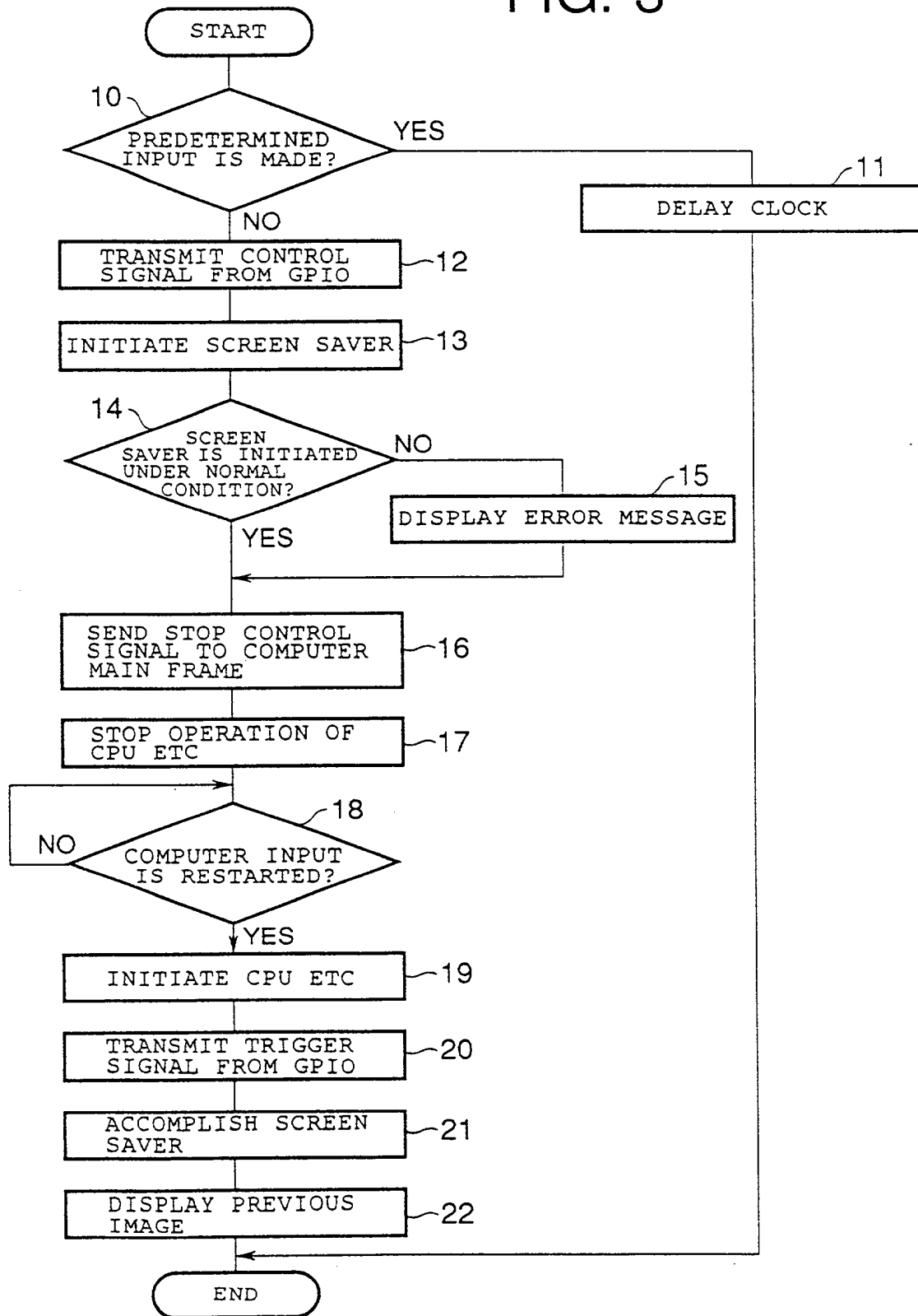


FIG. 4

| | | SYSTEM MODE | C P U | GRAPHICS CONTROLLER | SCREEN DISPLAY |
|-------------------|--|--------------|---------|---------------------|----------------|
| PRIOR ART | | NORMAL | NORMAL | NORMAL | o n |
| | | SCREEN SAVER | NORMAL | NORMAL | o n |
| | | SUSPEND | SUSPEND | SUSPEND | o f f |
| PRESENT INVENTION | | NORMAL | NORMAL | NORMAL | o n |
| | | SCREEN SAVER | SUSPEND | SUSPEND | o n |
| | | SUSPEND | SUSPEND | SUSPEND | o f f |

FIG. 5

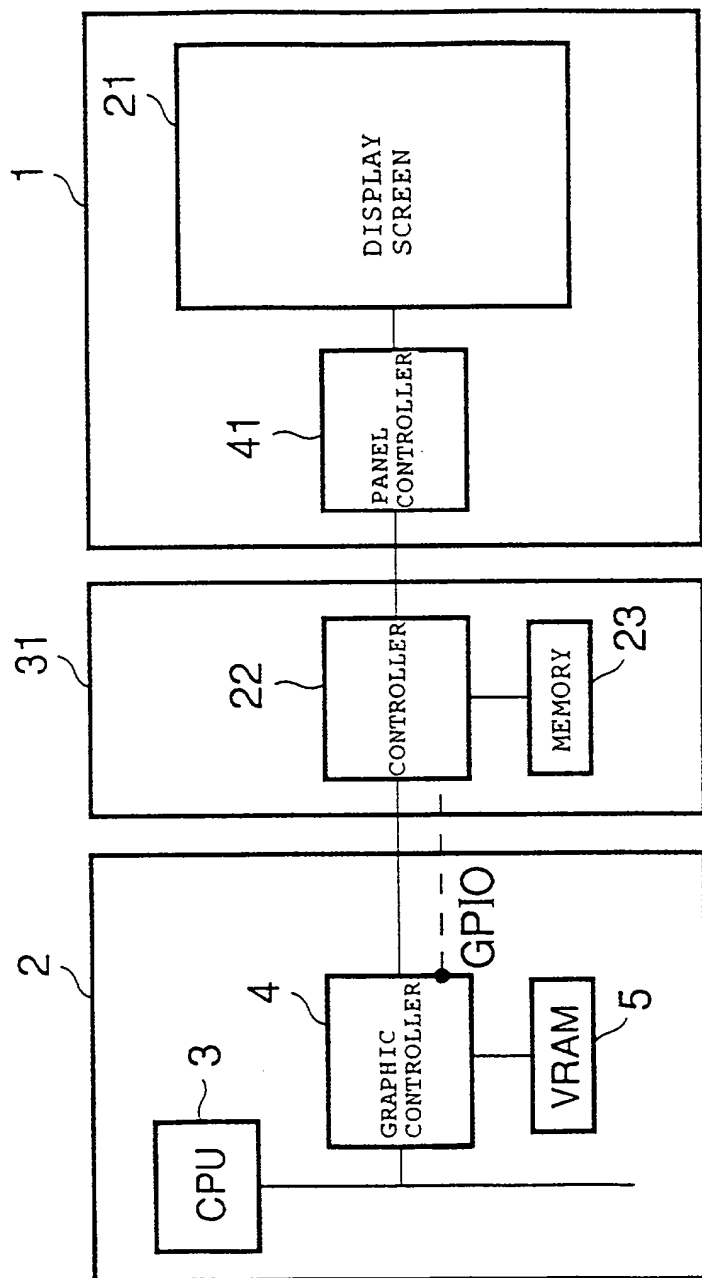
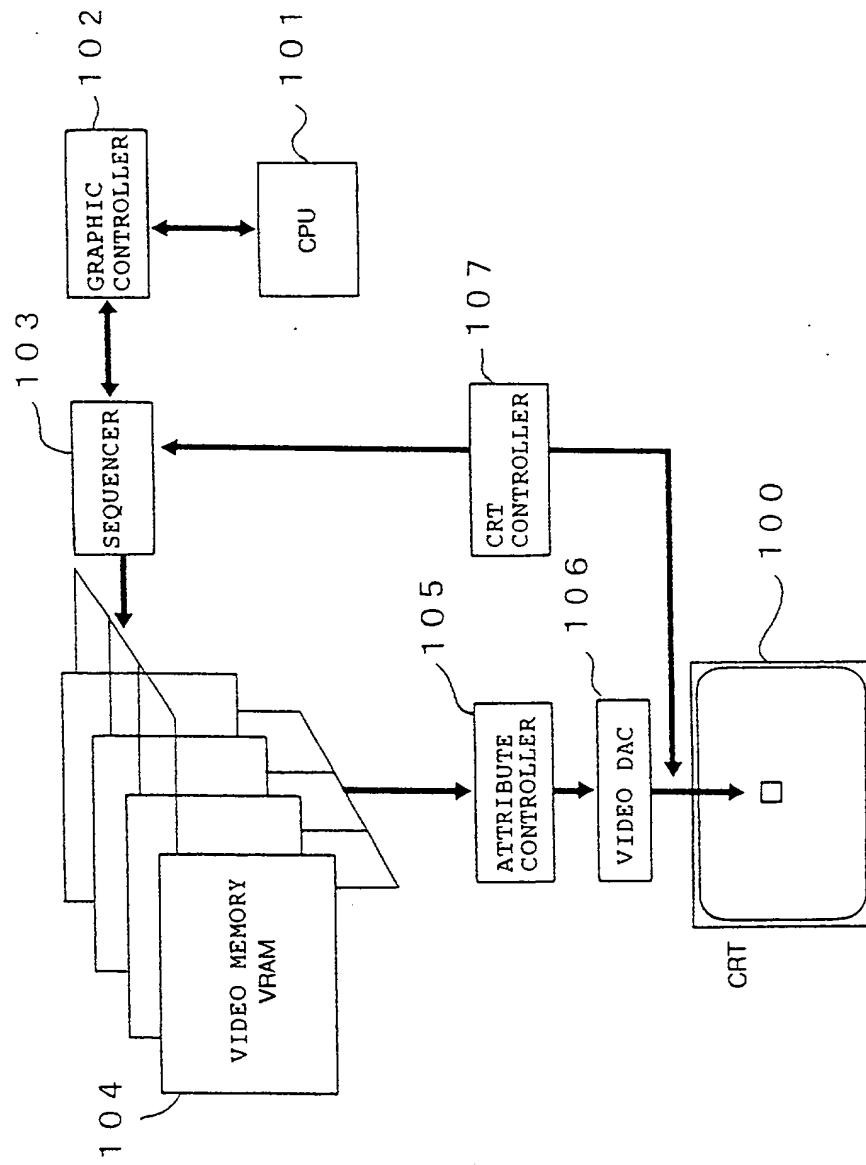


FIG. 6



Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、郵便箱、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

DISPLAY APPARATUS INCLUDING SCREEN SAVER FUNCTION

上記発明の明細書（下記の欄で×印がついていない場合は、本表に添付）は、

the specification of which is attached hereto unless the following box is checked:

☐ 月 日に提出され、米国出願番号または特許協定条約
国際出願番号を _____ とし、
（該当する場合） _____ に訂正されました。

☐ was filed on _____
as United States Application Number or
PCT International Application Number
_____ and was amended on
_____ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、遠邦規則第37編第1条56項に定義されるとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.55.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Japanese Language Declaration (日本語宣言書)

私は、米国法典第35編119条(a)-(d)項又は365条(b)項に基づき下記の、米国外の国の少なくとも一か国を指定している特許協力条約365(a)項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している。本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

Prior Foreign Application(s)

外国での先行出願

10-31805

(Number)
(番号)

Japan

(Country)
(国名)

(Number)
(番号)

(Country)
(国名)

私は、第35編米国法典119条(e)項に基づいて下記の米国外の特許出願規定に記載された権利をここに主張いたします。

(Application No.)
(出願番号)

(Filing Date)
(出願日)

私は、下記の米国法典第35編120条に基づいて下記の米国外の特許出願に記載された権利、又は米国外を指定している特許協力条約365条(c)に基づき権利をここに主張します。また、本出願の各請求範囲の内容が米国法典第35編112条第1項又は特許協力条約で規定された方法で先行する米国外の特許出願に開示されていない限り、その先行米国外出願書提出日以降で本出願書の日本国内または特許協力条約国際提出日までの期間中に入手された、連邦規則法典第37編1条56項で定義された特許資格の有無に関する重要な情報について開示義務があることを認識しています。

(Application No.)
(出願番号)

(Filing Date)
(出願日)

(Application No.)
(出願番号)

(Filing Date)
(出願日)

私は、私自身の知識に基づいて本宣言書中で私が行なう表明が真実であり、かつ私の入手した情報と私の信じることに基づき表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第18編第1001条に基づき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の表明を行えば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Priority Not Claimed

優先権主張なし

13/02/1998

(Day/Month/Year Filed)
(出願年月日)

☐

(Day/Month/Year Filed)
(出願年月日)

☐

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application No.)
(出願番号)

(Filing Date)
(出願日)

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

(Status: Patented, Pending, Abandoned)
(現況: 特許許可済、係属中、放棄済)

(Status: Patented, Pending, Abandoned)
(現況: 特許許可済、係属中、放棄済)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Japanese Language Declaration (日本語宣言書)

委任状 私は下記の発明者として、本出願に関する一切の
手続を 貴特許庁長官に対して遂行する弁理士または代理人
として、下記の者を指名いたします。(弁理士、または代理
人の氏名及び登録番号を明記のこと)

POWER OF ATTORNEY: As a named inventor, I hereby appoint
the following attorney(s) and/or agent(s) to prosecute this
application and transact all business in the Patent and Trademark
Office connected therewith (list name and registration number)

James D. Halsey, Jr., 22,729; Harry John Staas, 22,010; David M. Pitcher, 25,908; John C. Garvey, 28,607; J. Randall Beckers,
30,358; William F. Herbert, 31,024; Richard A. Gollhofer, 31,106; Mark J. Henry, 36,162; Gene M. Garner II, 34,172; Michael D.
Stein, 37,240; Paul I. Kravetz, 35,230; Gerald P. Joyce, III, 37,648; Todd E. Marlette, 35,269; Harlan B. Williams, Jr., 34,756;
George N. Stevens, 36,938; Michael C. Soldner, P-41,455 and William M. Schertler, 35,348 (agent)

書類送付先

H.J. Staas
Staas & Halsey
700 Eleventh Street, N.W. Suite 500
Washington, DC 20001

Send Correspondence to:

H. J. Staas
Staas & Halsey
700 Eleventh Street, N.W. Suite 500
Washington, DC 20001

直接電話連絡先: (名前及び電話番号)

Telephone: 202-434-1500
Facsimile: 202-434-1501

Direct Telephone Calls to: (name and telephone number)

Telephone: 202-434-1500
Facsimile: 202-434-1501

| | | |
|-------------|---|----------------------------------|
| 唯一または第一発明者名 | Full name of sole or first inventor | |
| | Nobuharu IINUMA | |
| 発明者の署名 | 日付 | Inventor's signature Date |
| | | Nobuharu Iinuma July 9, 1998 |
| 住所 | Residence | |
| | Kawasaki-shi, Kanagawa, Japan | |
| 国籍 | Citizenship | |
| | Japan | |
| 郵便局 | Post Office Address | |
| | c/o Fujitsu Limited, 1-1, Kamikodanaka 4-chome, Nakahara-ku, Kawasaki-shi Kanagawa 211-8588 Japan | |
| 第二共同発明者 | Full name of second joint inventor, if any | |
| 第二共同発明者 | 日付 | Second inventor's signature Date |
| | | |
| 住所 | Residence | |
| | | |
| 国籍 | Citizenship | |
| | | |
| 郵便局 | Post Office Address | |
| | | |

(第三以降の共同発明者についても同様に記載し、署名をす
ること)

(Supply similar information and signature for third and subsequent
joint inventors.)